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WELFARIST AND NON-WELFARIST CONCEPTIONS OF "HEALTH PROMOTION"

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ABSTRACT

Although "health promotion" programs account for only a small proportion of health spending in OECD countries (OECD, 2000), their components (anti-smoking, pro-exercise and vaccination campaigns, for example) are often highly visible instruments of health policy. Furthermore, the case for increased spending on such programs is likely to intensify if evidence of (i) their effectiveness; and (ii) diminishing returns to spending on other categories of health services (e.g., curative and acute medical services), grows. Economists' contributions to the literatures on, *inter alia*, (i) rational addiction; (ii) (licit and illicit) drug use; (iii) health production; and (iv) health sector economic evaluation; are pertinent to this health sub-sector. However, no integrated economic conception of the field of health promotion has been produced. This paper provides such an account: the instruments and targets of health promotion are analysed in an integrated framework by drawing on concepts from the public economics and health economics literatures. The analyses emphasise the material differences in welfare outcomes that can arise, depending on whether the objective of a health promotion program is to maximise welfare, or to pursue another, e.g. health-stock, objective.

Keywords: economic analysis, health promotion, welfare.

1. INTRODUCTION

Programs that are designed to modify health status via non-clinical means, especially by modifying consumer behaviour, are commonplace in the health sector. Although expenditure on "public health and prevention" programs still constitutes a relatively small proportion of total health expenditures in most OECD countries, this proportion has increased in recent years in most countries for which data are available (see, e.g. OECD, 2000). One explanation for the growth of such programs is that there is an expectation, amongst policy makers, that the marginal products of these programs will exceed, or equal, that of marginal allocations to acute and curative medical care.

Economists have made a number of important contributions to the public health literature. The literatures on health production, rational addiction, and economic evaluation, for example, each contain pertinent contributions. Yet, no integrated economic treatment of the field of health promotion has been produced. Is this lacuna of any importance? There are several reasons to respond in the affirmative.

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First, the field of health promotion is now not only academically distinct (in the health literature, for example), it is also a distinct, and growing, sector of the health economy in many countries. According to the OECD (2000), total spending on "prevention and public health" increased, as a proportion of total US health spending from 2.8 per cent, in 1960, to 3.5 per cent in 1999. In Canada, the rate of relative growth has been much more dramatic: the proportion of total health expenditure on "prevention and public health" doubled from three per cent, in 1970, to 6.0 per cent in 1999. In fact, in only two OECD countries for which data are available, *viz.* Germany and Korea, has relative spending on this element of the health sector apparently decreased over the past few decades. Thus, by and large, it may be said that the "economic stakes" in this health sub-sector have increased.

Second, the role of government in this sector is non-trivial. Although the relevant disaggregated data are not (readily) available, one may surmise that increased spending on health promotion is likely to be accompanied by growing public sector involvement in that field, be it in financing, provision, distribution, or all of these functions. Thus, it also appears increasingly important that the welfare effects of various health promotion strategies (and their potential interdependence with the objective, target, and instrument selected) should be clarified. Since the welfare losses generated by erroneous policies are likely to be amplified, not only by the size of the policy miscalculations, but the magnitude of the affected programs, so too the impetus for clear and careful policy formulation in this field grows.

Finally, the non-economic literature on health promotion, while mostly united in purpose, does not appear to be united, conceptually, on the question "What **is** health promotion?" While the conceptual framework employed in this paper represents one of only a number of disciplines (i.e. economics) that might be brought to bear, its application sheds some light on a question to which a complete answer has not been given. Applications of other disciplines to address this same question may also be fruitful.

The analysis conducted here is intended to address the key issues outlined above. The theoretical basis of the conceptual work presented in this paper is Becker's (1965) model of household production and Grossman's (1972) lauded application of it to health production and intertemporal utility maximisation. (A brief mathematical statement of Grossman's (1972) model is contained in Appendix 1.) However, some economies of exposition have been necessary and it is useful to outline some of these at the outset. First, although the notions of social welfare and welfare maximisation are central, aggregate analyses invoking social welfare functions, utility possibility frontiers, and so on, are eschewed here. For the purposes of this paper, analyses at the level of the individual consumer-producer are be sufficient to illustrate the central principles of importance. Second, the focus of this paper is explicitly on health promotion schemes that involve information dissemination. This focus is adopted largely to the exclusion of considerations of other sources of market failure (see, e.g. Bator, 1957) and is adopted for reasons of space. It is, of course, recognised that market failure can arise for a variety of reasons - externalities, public goods and market power are also potential sources of welfare loss - however, a discussion of these is extraneous to the central task of this paper. Finally, the inter-temporal dimensions of the Grossman (1972) framework are suppressed for the purposes of this paper. This issue is afforded further discussion, below.

The contents of the paper are arranged as follows: Section 2 provides a brief overview of several conceptions of "health promotion" from the non-economic literature. The purpose of

this Section is to set the economic analysis in the context of the field it seeks to represent. Section 3 produces an economic conception of health promotion: it explores the implications of different assumptions about policy objectives and the influence of these on the instruments and targets of health promotion policies and, importantly, welfare outcomes. Section 4 concludes that in health promotion, as in other fields of public policy, a clear statement of objectives, and the selection of consistent instruments and targets are non-trivial considerations.

2. "WHAT IS *HEALTH PROMOTION*?" A NON-ECONOMIC ANSWER

The question "what is health promotion?" continues to de-energize all those involved in this activity…(Ashton and Seymour, 1998).

Economic discussions of industries are sometimes subject to boundary disputes concerning the inclusion and exclusion of particular types of firms. Consensus on a core of elements is usually not difficult to achieve (e.g., that hospitals qualify as part of the health sector is uncontroversial), while other elements are subject to disagreement (e.g., whether or not nursing homes "qualify" as part of the health sector may be subject to disagreement). The (non-economic) literature on health promotion is also subject to boundary disputes. It is worthwhile to consider several of the competing notions of health promotion, before proceeding to the economic analysis.

First, it is useful to consider terminological issues. One source of disagreement in the health promotion literature derives from the ambiguity of the word "promotion". Jones & Naidoo (1997, p.75) are among the surprisingly few authors who recognise this source of ambiguity, explicitly, in their review of the field:

> [h]ealth promotion…has been defined in varied (*sic*) ways. The word "promotion" is an ambiguous term and is used in relation both to raising someone's [health] status…and to advertising or other campaigns to sell something.

Dines & Cribb (1993, p.21) too, recognise this source of ambiguity. They write:

> The first [sense of the term "promotion"] derives from salesmanship: there may be a promotion for a particular product, whereby through audio-visual means and persuasive argument customers are encouraged to purchase what is on offer. In this way to promote is to sell, to put forward and to place in the forefront of attention.

They argue that, when this (first) conception of the term promotion is adopted,

[h]ealth promotion becomes placing the absence of disease, foundations for achievement and well-being in the forefront of attention.

While the second sense of the term "promotion"

…emanates from the workplace: a person may be promoted to a new position. Here promotion concerns raising to a higher level (Dines & Cribb, 1993, p.21).

These different senses of the term promotion may have profound boundary implications for one's conception of the field. Taking the second sense of the term, in particular, it is difficult to conceive of **any** health sector activity that is not undertaken with a view to improving (or maintaining) some dimension of health, i.e. with raising health "to a higher level". Indeed,

Tones (1985) clearly ascribes to this catholic conception of the field, defining health promotion as "any activity [that is] designed to foster health". According to this conception, even acute curative medical services (e.g., appendectomies) may apparently be considered part of health promotion. (More recently, the same author also suggested the following bizzararie: "...we might distil the concept of health promotion into the following "quintessential" formula: health promotion = health education x public policy" (Tones, 1997, p.786).)

It is more common, however, for authors on health promotion to exclude curative and acute medical services from their definitions of the field. Ewles & Simnet (1995, p.24), for example, argue that the following World Health Organization (1984) definition:

[h]ealth promotion is the process of enabling people to increase control over, and to improve, their health;

excludes "…things which need to be done to people (like taking out their appendix or placing them in a foster home)…" - although this exclusivity is, arguably, not self-evident.

Downie, Fyfe & Tannahill (1990) have also excluded curative and acute medical services from their conception of the field (Jones & Naidoo, 1997). This approach, while popular, is not universally accepted; rather, there is

…continuing debate about whether health promotion should include disease reduction, prevention and health protection or whether it should be concerned solely with positive health. French (1990) has questioned why disease management shouldn't be included, whereas Downie *et al.* (1990) specifically excluded curative and acute medical services (Jones & Naidoo, 1997, p.76).

Perhaps the most influential health promotion document of recent decades is The World Health Organization's (1986) *Ottawa Charter for Health Promotion*. In that document, health promotion was defined as follows:

Health promotion is the process of enabling people to increase control over, and to improve, their health. To reach a state of complete physical, mental and social well-being, an individual or group must be able to identify and to realize aspirations, to satisfy needs, and to change or cope with the environment. Health is, therefore, seen as a resource for everyday life, not the objective of living. Health is a positive concept emphasizing social and personal resources, as well as physical capacities. Therefore, health promotion is not just the responsibility of the health sector, but goes beyond healthy life-styles to well-being (World Health Organization, 1986, http://www.who.int/hpr/docs/ottawa.html).

Once again, this definition encapsulates a very broad range of activities. Indeed, it not only includes health sector activities, but also explicitly encapsulates activities outside the health sector.

Contrast these general conceptions of health promotion with the more exclusive taxonomy employed by the (US) Department of Health and Human Services (1980). That body employed 15 "objects of intervention" and classified these under 3 headings, *viz.* (a) preventive health services, (b) health protection and (c) health promotion. The structure, which was invoked for planning health improvement strategies by the Department, was as follows:

(a) *Preventive Health Services*
- High blood pressure control
- Family planning
- Pregnancy and infant care
- Immunisations
- Sexually transmitted diseases services

(b) *Health Protection*
- Toxic agent control
- Occupational safety and health
- Accidental injury control
- Fluoridation of community water supplies
- Infectious agent control

(c) *Health Promotion*
- Smoking cessation
- Reducing misuse of alcohol and drugs
- Improved nutrition
- Exercise and fitness
- Stress control

(Department of Health and Human Services, 1980, p.386).

Interestingly, there is no element of categories (a), (b) or (c) that is unconcerned with illness prevention or reduction. Consider category (c), "Health Promotion", in particular. Arguably, there is **no** element of category (c) that involves curative or acute medical care (although perhaps exceptions now exist in relation to the treatments for alcohol and drug "misuse", e.g. the use of acute "rapid detoxification" methods). Rather, the elements of this category, e.g. "Smoking cessation", "Reducing drug and alcohol misuse", "Exercise and fitness", etc., are items over which individuals themselves must exert control. Put another way, these elements appear principally to concern the **behaviour**, or **choices**, of individuals.

The elements of category (a), on the other hand (such as "Blood pressure control", "Immunisations", and so on), although uniformly and actively involving consumer choice, also appear to involve the services of medical practitioners. For example, consumers must choose to be immunised and then invest their time to be vaccinated; but medical inputs (e.g. swabs, vaccines, syringes, medical labour and capital) are also involved. Put simply, the elements of category (a) appear to involve "doing things to" consumers.

Finally, consider category (b), "Health Protection". Some elements of this category, e.g. "Occupational safety and health", "Fluoridation of community water supplies", "Infectious agent control", etc., seem to involve less active consumer participation than those of categories (a) and (c). In fact, in the case of water fluoridation individual consumers do not make any direct choice in relation to the consumption of fluoride - a decision to consume the water supplied by the municipal authorities constitutes a *de facto* decision to consume fluoride. In this, and for each other element of (b), individual consumers who regard the outcomes as "bads" may actually incur time and/or money costs to avoid the outcomes (e.g. by purchasing water-filtering equipment, or by shipping unfluoridated water from another region).

It is also noteworthy that none of the elements in categories (a) or (c) conflicts with the definitions of health promotion cited previously, perhaps with the exception of World Health

Organization (1984). Recall that this particular definition included the statement that health promotion involves "enabling people to increase control over…their health". Since elements of category (b), such as water fluoridation, may actually **decrease** the control of individuals over their health (by reducing the consumer's capacity to choose between alternative consumption patterns), these may be inconsistent with the World Health Organization's (1984) conception of health promotion.

The preceding discussion draws upon several illustrative examples of the variety of conceptions of "health promotion" that exist in the literature. Although further variations on this theme are possible, their discussion is subject to diminishing returns. It is useful, though, to summarise the key differences between the two general conceptions of the field that appear to dominate. These are usefully summarised by invoking a distinction between necessary and sufficient conditions. For some authors, e.g. Tones (1985), a concern with health improvement qualifies an activity for the use of the descriptor "health promotion", i.e. "health improvement" is a sufficient condition. For others, e.g. Downie, *et al.* (1990), a concern for health improvement is a necessary, but not a sufficient, condition. The latter *genre* is clearly more exclusive than the former: definitions of this kind generally exclude at least curative and acute medical services (see, e.g. Downie *et al.*, 1990) and sometimes also exclude preventive interventions that involve the services of medical practitioners, such as vaccinations (see, e.g. Department of Health and Human Services, 1980).

With these distinctions in mind, attention is now directed to an economic interpretation of health promotion which, *inter alia*, attempts to place a spectrum of non-economic views of health and non-health production in an economic framework.

3. AN ECONOMIC CONCEPTION OF HEALTH PROMOTION

> In the progress of society, philosophy or speculation becomes, like every other employment…subdivided into a great number of different branches, each of which affords occupation to a peculiar tribe or class of philosophers; and this subdivision of employment in philosophy, as well as in every other business, improves dexterity, and saves time (Smith, 1776, p.23).

A working definition of health promotion is required for the purposes of this paper. In arriving at such a definition, it is useful to recall Bob Evans's (1984) argument regarding the delineation of the field of health economics from other sub-disciplines of economics: his treatment of that issue was also essentially concerned with a distinction between necessary and sufficient conditions. Specifically, he argued that, if the economics of all activities that affect health were considered part of health economics, health economics would rapidly become the "economics of everything". Consequently, Evans (1984) argued for a more exclusive, and arguably more useful, definition of health economics as that area of economics that is concerned with goods and services produced primarily for the purposes of improving health.

A similar approach is useful in relation to health promotion. For the purposes of this paper health promotion is defined as *that set of activities that is designed to affect the consumption of goods and services, primarily for the purposes of enhancing health, or preventing illness.* It is important to note the emphasis this definition places on consumption: it presupposes **consumption** or, more specifically, the modification of consumption, is the mechanism via

which health promotion programs operate. This definition thus excludes medical services, including those that are "preventive" in nature; but it encapsulates efforts to affect the **consumption** of such services. For example, vaccinations *per se*, are deemed outside the scope of health promotion, according to this definition. However, programs that are designed to encourage immunisation are not outside its scope. By contrast, note that programs such as water fluoridation **are** excluded: although programs of this kind effect changes to consumption, they do not do so via the mechanism of choice. The above definition thus differs from the definitions of the Department of Health and Human Services (1980) and the World Health Organization (1984), for example.

With this definition in mind, it is pertinent to consider mechanisms via which consumer choices can be affected. According to consumer demand theory (see, e.g. Deaton and Muellbauer, 1980) and household production theory (Becker, 1965), consumption patterns are affected by (i) consumer preferences; (ii) consumer knowledge; (iii); relative prices; (iv) the contents of the opportunity (or choice) set(s); and (v) the budget constraint. Mechanisms (iii) through (v) are often closely related, but distinctions between them are appropriate, since this paper invokes the useful distinction between market goods consumption and household production.

If health promotion is a set of activities that is designed to affect consumption patterns (for a specific purpose), mechanisms (i) to (v) represent an array of potential policy instruments for health promoters. Specifically, the relevant policy instruments are those that affect health-related consumption and hence the household production of health and non-health outputs. A more detailed consideration of these consumption-production activities is central to the analyses presented in this paper.

The definition of health promotion that has been invoked here suggests that an important health promotion target is health, *per se*. It is important to point out, in this context, that a variety of **motivations** may be consistent with the pursuit of a given target. For example, policies that are health-improving could be motivated by a desire to maximise social welfare, as this term is used in the conventional discourse of welfare economics. In such cases, health is simply an intermediate target of policy. However, a variety of factors other than welfare maximisation can also motivate health policy (see, e.g. Feldstein, 1998) and, indeed, public policy more generally (for an overview of the latter, see, e.g. Cullis & Jones (1992)). The teleological objective of some health policy might, in fact, be to maximise health (however measured) *per se*. On the other hand, Lewis (1996), for example, has argued that technocratic, rather than economic (or health), considerations are responsible for the determination of Australia's guidelines on water quality. Alternatively, the goals of policy makers may be to maximise prestige, pay, power, etc., as Niskanen (1968, 1971) has suggested. In the latter case, the relationships between policy targets and the utility of the bureaucrat are central.

In this paper, a distinction is drawn between health promotion programs that are motivated by the goal of welfare maximisation, and those that are not. For simplicity, the former will be referred to as "welfarist" (as that term is used by Culyer, 1991) health promotion programs, and the latter will be referred to as "non-welfarist" health promotion programs. This latter, non-welfarist conception, is explicitly introduced to acknowledge that objectives other than social welfare maximisation could motivate health promotion policies. This is a scenario that, more generally, is associated with the "public choice" school in economics, in which there is a

...presumption that persons in their roles as "public choosers", whether as constituency members or political agents, retain essentially the same behavioral characteristics that they exhibit in their nonpublic roles...(Buchanan, 1999, p.126);

and, this presumption gives rise to the prediction that

...persons, singly or in groups, will seek to further their own interests as they participate in the public and in the private economy (Buchanan, 1999, p.127).

The purpose of this acknowledgement, in the current paper, is not to paint a unidimensional portrait of lazy and "self-aggrandizing" bureaucrats (Musgrave, 1999), but to acknowledge that a variety of items, other than (but perhaps including) social welfare maximisation, could enter the utility function of the health promoter.

To fix ideas, it is useful to refer to the economic literature on the theory of the firm. In economics, it is typically assumed that firms seek to maximise profits. However, economists have also explored the implications of a range of other objectives, including sales maximisation (Baumol, 1958); growth (or discounted future sales) maximisation (Williamson, 1966), output maximisation (in the specific context of Soviet enterprises) (Ames, 1965); and numerous others (see, e.g., the collection of papers in Archibald (1971)).

In relation to the task at hand in this paper, it is useful to recall the bureaucrat's utility function that was employed by Ames (1965). The utility function for the Soviet bureaucrat included both profit and output arguments, and these were afforded utility weights. At a general level, the ideas behind Ames's conception of the Soviet enterprise are usefully employed, in the present context, to distinguish the non-welfarist and welfarist cases referred to above. Abstracting from inter-temporal dimensions of Grossman's (1972) model (including the notions of a "service flow" of healthy days and health stock depreciation), suppose the utility function of each of the j individuals in the society, in the purview of the health promoter, may be re-written as follows:

$$U_j = \alpha_j H_j + (1-\alpha_j) Z_j \qquad (1),$$

where U is utility, α_j and $(1-\alpha_j)$ are the utility weights of the jth individual, H_j is the health stock of the jth individual at a given point in time, and Z_j is the jth individual's non-health consumption at that point in time. Suppose that we may then write the health promoter's utility function as follows:

$$U_{HP} = \alpha_{HP} \sum_{j=1}^{n} H_j + (1-\alpha_{HP}) \sum_{j=1}^{n} Z_j \qquad (2)$$

where α_{HP} and $(1-\alpha_{HP})$ are the health promoter's utility weights on the H and Z consumption of the j individuals. In addition to their "instantaneous" nature, utility functions (1) and (2) entail several simplifying abstractions. First, Equation (1) abstracts from possible utility interdependencies between the j individuals. Second, equation (2) abstracts from any utility derived by the health promoter from his/her own consumption of H and Z. When α_{HP} takes values between zero and unity, the indifference curves of the health promoter take on familiar characteristics. However, in the special cases when $\alpha_{HP}=0$, or $\alpha_{HP}=1$, the indifference curves

of the health promoter will be straight lines, parallel to the relevant axes. These issues will be taken up later in some detail, in geometric expositions.

Now, consider the fundamental difference between the utility function given by Equation (2), and the following utility function:

$$U_{HP} = \sum_{j=1}^{n} U_j = \sum_{j=1}^{n} a_j H_j + \sum_{j=1}^{n} (1 - a_j) Z_j \qquad (3).$$

The utility function described by Equation (2) indicates that the health promoter's utility derives from both the pattern and the levels of **consumption** of *H* and *Z* by the *j* individuals in the population. By contrast, the utility function given by Equation (3) indicates that the utility of the health promoter derives, not from consumption patterns of individuals *per se*, but the **utility** that each of the *j* individuals derives from his/her own consumption pattern. Thus, in the language employed above, Equation (2) represents the utility function of a "non-welfarist" health promoter, while Equation (3) represents the utility function of a "welfarist" health promoter. While, in the former case, it is the health promoter's utility weights, a_{HP} and $(1\text{-}a_{HP})$, that "matter" in the formulation of policy, it is the utility weights a_j and $(1\text{-}a_j)$ of **individuals**, that "matter" in the welfarist case.

It is useful to explore the implications of different assumptions about the values of a by considering some extreme cases. First, consider Figure 1, in which a_{HP} is assumed to take the value of unity. In this case, the health promoter's preferences are lexicographic: s/he derives zero utility from the non-health consumption of individuals, so $MRTS_{ZH} = \infty$, and his/her indifference curves in Figure 1, e.g. IO_{HP1} through IO_{HP3}, are straight lines, parallel to the *x*-axis. Suppose that the curve marked PPF_j, in Figure 1, describes the *H* and *Z* production possibilities for the *j*th individual in the relevant society. (Note that H_{MIN}, the minimum health stock, is non-zero by assumption, i.e. it is assumed that the health stock is non-zero, even if no health inputs are used.) The health promoter's indifference curves provide a corner solution for the health promoter at *V*: the utility of the health promoter is maximised when $H_j = H_{MAX}$ and $Z = 0$. (Indeed, when the health promoter's preferences are of the form depicted in Figure 1, a health-maximising corner solution will always arise, provided the PPF_j is strictly concave to the origin.)

Now consider Figure 2, which presents PPF_j and indifference curves for the *j*th individual, marked IO_{j1} through IO_{j3}. In this extreme case, $a_j = 0$, and the *j*th individual's $MRS_{ZH} = 0$. This assumption (well-summarised by the adage "Eat, drink, and be merry, for tomorrow we die") gives rise to indifference curves that are parallel to the *y*-axis, and the selection of output bundle $K = Z_{MAX}, H_{MIN}$. Note that this extreme case results in non-zero health stock, by assumption.

Figure 3 presents another extreme, *viz*. that in which $(1 - a_{HP}) < 0$. This case, in which the health promoter derives disutility from Z_j consumption, gives rise to $MRS_{ZH} < 0$, and generates positively-sloped indifference curves for the health promoter. As was the case in Figure 1, a "health-stock-maximising" solution arises at *V*. A health-maximising solution is inevitable when preferences take this form, even if the PPF_j is not strictly concave to the origin. (The U_{HP}-maximising basket may not, however, be a true "corner" solution if the PPF_j is not strictly concave: i.e. the basket contain some *Z*, in such cases.)

Figure 1
Lexicographic preferences for a health promoter, expressed over the health (*H*) and non-health (*Z*) consumption of individual *j*

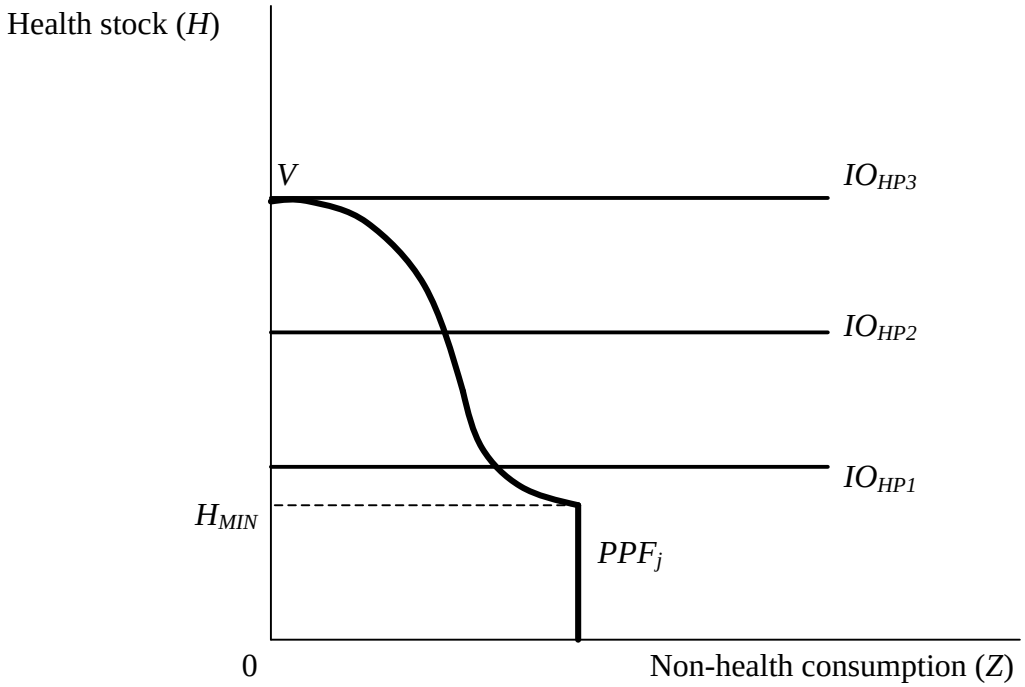


FIGURE 2
Lexicographic preferences for individual *j* over health (*H*) and non-health (*Z*) consumption

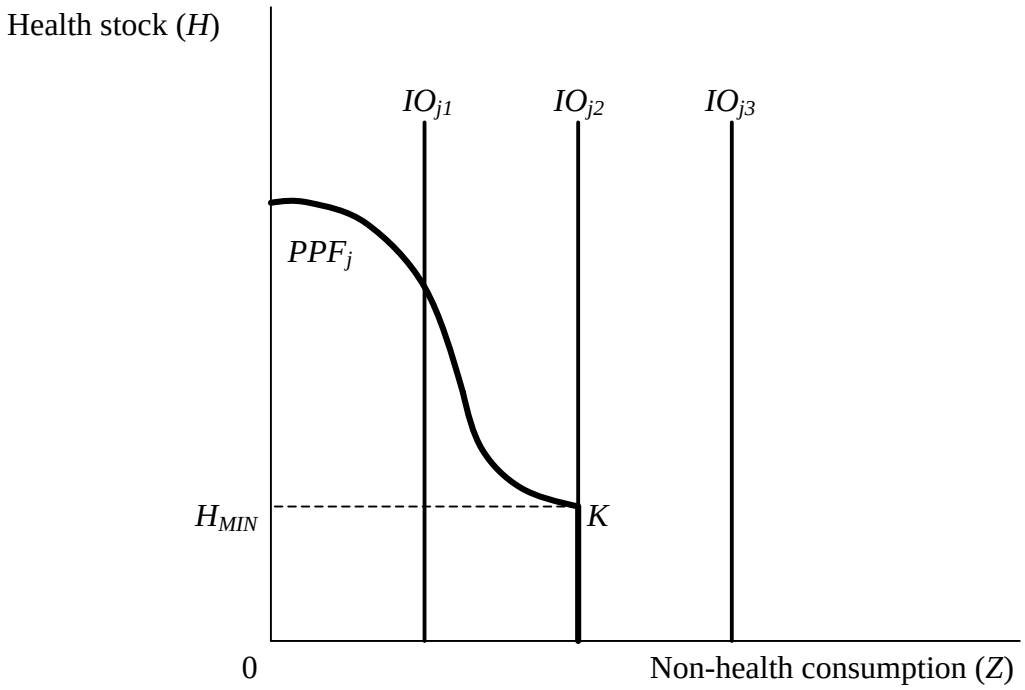
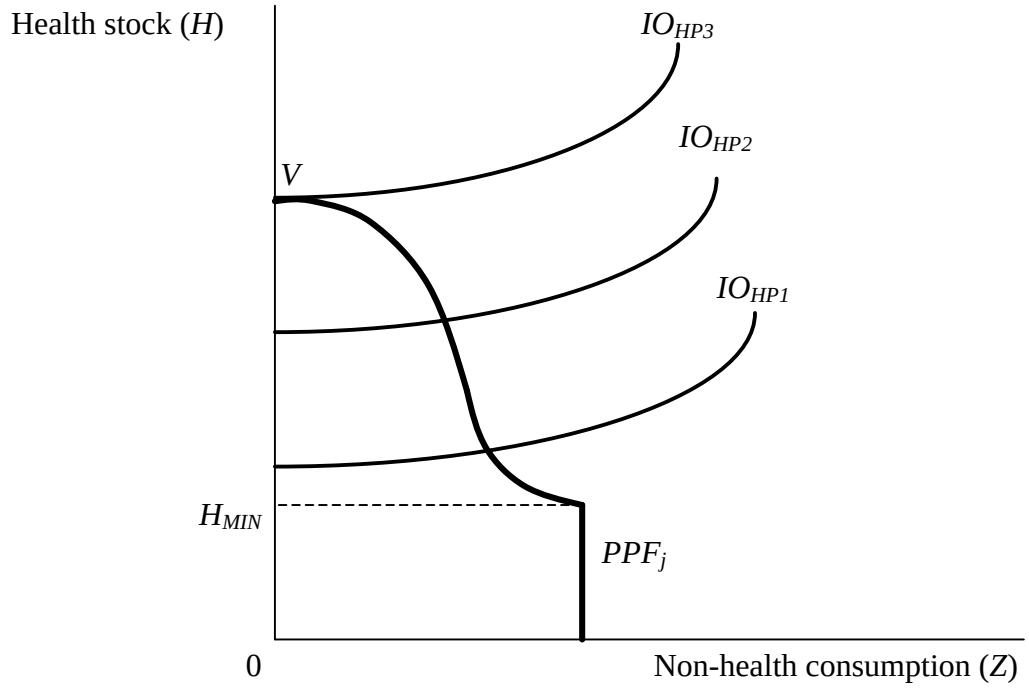


FIGURE 3
Health promoter's preferences expressed over the health (H) and non-health (Z) consumption of individual j when non-health consumption is a "bad"



Finally, and without geometry, one can imagine the "intermediate" cases in which health promoters and individuals have utility weights $0 < a < 1$. The critical issue then becomes to what extent the utility weights of health promoters and individuals in their purview differ, and the extent to which the health promoter can use his/her budget to affect the composition of the output bundles of those individuals.

In the welfarist case, since the health promoter's utility is a function of the utilities of the *j* individuals there is no divergence, absent market failure, of the views of the health promoter and of individuals, about the composition of the "optimal" output bundles. An important implication of this observation is as follows: if the teleological purpose of health promotion is welfarist (i.e., to maximise welfare), market failure in the health sector is a **necessary condition** for the institution of a health promotion "intervention". All health promotion programs that are motivated by welfarist considerations will, essentially, be programs to correct inefficiencies that arise due to the existence of externalities, public goods, problems of information, or problems of market power. The targets of welfarist health promotion initiatives become quite clear: they are the sources of market failure that are responsible for distorting the health-related decisions of individuals, and thereby reducing their utilities.

By contrast, if the teleological end of health promotion is non-welfarist in nature market failure is **not even a necessary condition** for health promotion "interventions". Instead, the selection of targets and use of the instruments of health promotion are manifestations of health promoter's own consumption weights over health and non-health outputs, subject to whatever resource constraints (e.g. the health promoter's budget constraint and other institutional constraints) are applicable.

3.1 Grossman's Health Stock Model and Some Further Geometry

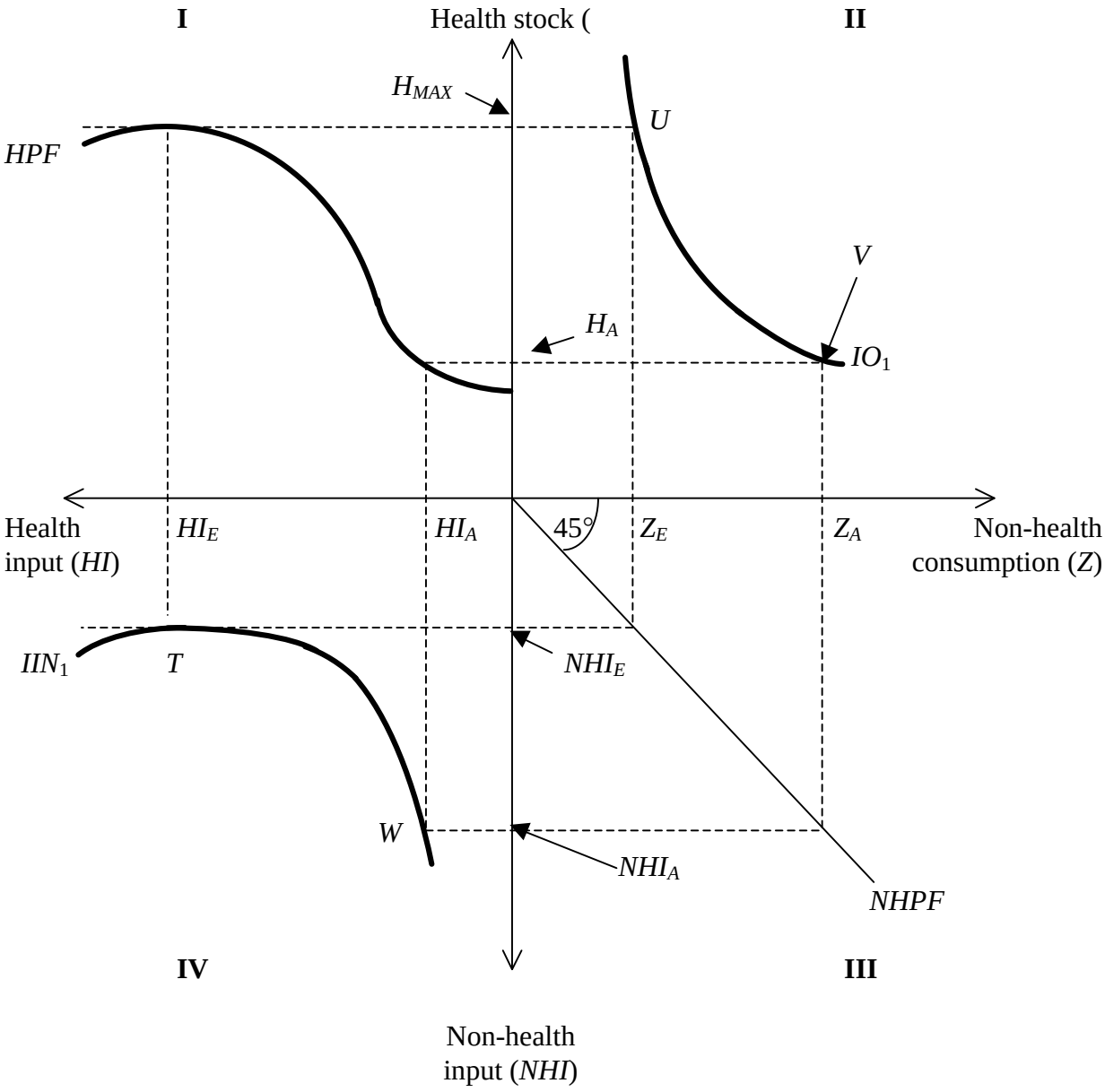
Henceforth, the analysis is primarily geometric. The framework to be employed is inspired by Hadley's (1982) and Wagstaff's (1986) graphical interpretations of Grossman's 1972) model; and they are, as such, primarily of a comparative static nature. The intertemporal dimensions of the Grossman (1972) model are explicitly acknowledged. However the focus of this paper is on consumer decisions and outcomes in adjacent time periods and, for the purposes of simplification, some temporal dimensions of the Grossman (1972) model (e.g., health stock depreciation, and healthy days service flows) are not given explicit treatment.

Figure 4 presents a stylised representation of (part of) Grossman's (1972) model. Quadrant I contains the health production function of an individual (the *j* subscript is now suppressed, for convenience): it relates the consumption of health inputs to the production of health stock. The function is assumed not only to become subject to diminishing marginal returns in the health input (*HI*) but also, eventually, zero marginal returns (at HI_E) and, finally, negative marginal returns (for $HI>HI_E$). H_{MAX} thus represents the maximum producible health stock for the individual, with an input requirement of HI_E.

Quadrant II contains an indifference curve, IO_2, for the individual, drawn over output space. The pertinent outputs are health stock (*H*) and non-health consumption (*Z*). Thus, indifference curves in this space represent the consumer-producer's (hereinafter, simply "the individual's") "underlying" preferences for health and other consumption. The fundamental nature of the preferences depicted in Quadrant II deserves emphasis: the consumer's input preferences are derivative of his/her (i) preferences over outputs; and (ii) his/her understanding of the technologies of health production and non-health production.
Quadrant III presents the non-health production function, *NHPF*. For analytical convenience, it is assumed that the non-health production function is homogeneous of degree one, yielding a linear function in non-health input (*NHI*)-*Z* space. It is also assumed, for convenience, but without loss of generality, that the production function has a zero intercept and unit-slope. The ray from the origin produced by these assumptions has a slope of 45°, which enables *NHPF* to serve as a reference line to Quadrants II and IV.

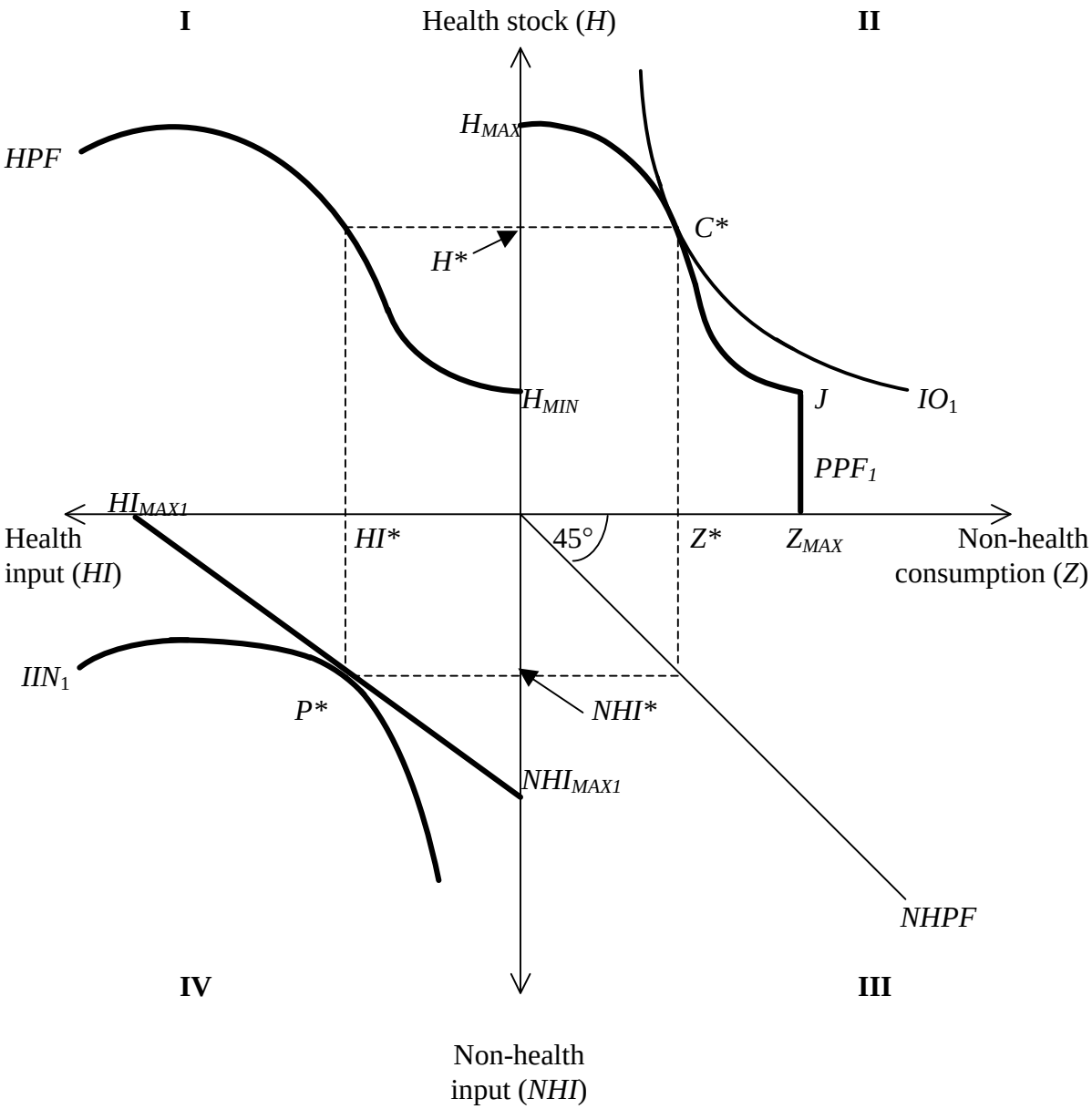
Quadrant IV presents one of an infinite number of input indifference curves, IIN_1. The relevant inputs are *NHI* and *HI* and, as indicated above, the consumer's preferences over them are derived from the relationships in Quadrants I-III. For example, the output combinations *U* and *V*, on IO_2, correspond with input combinations *W* and *T*, respectively, on IIN_1. The indifference curve IO_2 has the properties generally expected of a conventional indifference curve for two goods and hence it is strictly convex to the origin. Note, however, that IIN_2 is not strictly convex to the origin. Rather, for combinations on IIN_2 where $HI > HI_E$, the marginal rate of substitution of health input for non-health input ($MRS_{HI\ NHI} = \partial NHI / \partial HI$) becomes zero, and then changes sign (i.e., $MRS_{HI\ NHI} = -\partial NHI / \partial HI$). This non-convexity arises due to the fact that increments of $HI>HI_E$ do not increase, and then actually reduce, the stock of health, while simultaneously decreasing non-health production-consumption possibilities. Thus, in the region of $HI >HI_E$ health inputs are output- and hence utility-decreasing ("bads") and their consumption must be compensated by increasing other consumption (*Z*) to maintain constant utility. In input space, this demands an increased allocation in *NHI*.

Figure 4
Consumer"s preferences expressed over health inputs and derived from preferences over health stock and non-health consumption



The utility-maximising output combination(s), and the corresponding optimum input bundle(s) cannot be discerned from Figure 4. Information about the consumer's budget constraint must also be introduced. Figure 5 presents the consumer's budget line ($HI_{MAX1}NHI_{MAX1}$), in Quadrant IV and, in Quadrant II the production-possibilities frontier (*PPF*) for the individual has been derived. The *PPF* derives from the budget constraint and the technical relationships in Quadrants II and III. For example, its intercepts, H_{MAX} and Z_{MAX}, are found by taking corner solutions on the inputs budget line, at HI_{MAX1} and NHI_{MAX1}, respectively. Note that the latter input corner solution produces the output bundle K (=Z_{MAX}, H_{MIN}>0). This outcome arises due to the assumption evident from the positive intercept on *HPF* (in Quadrant I), *viz.* that the stock of health will be non-zero, even if the consumption of health inputs is zero.

Figure 5
Output and input equilibria for health production



Given the state of technology, the relative prices of inputs, the consumer's preferences, and the budget depicted in Figure 5, the bundle C^* ($=H^*$, Z^*) is uniquely utility-maximising, or the "welfarist" outcome. Thus, in the absence of market failure, the consumer will choose the input bundle P^* ($=HI^*$, NHI^*) and produce the utility-maximising output bundle C^*. (This C^* basket will serve as an important reference point for the remainder of the geometric analysis.)

How can the role of health promotion be depicted in this framework?

3.2 INSTRUMENTS AND TARGETS OF WELFARIST HEALTH PROMOTION STRATEGIES

According to the welfarist conception of health promotion presented above, health promotion policies have no role to play in a world that is devoid of market failure. Assuming a utilitarian social welfare function, if individuals attain their utility-maxima without public intervention, government intervention will not Pareto-improve social welfare.

If markets do fail, though, the resulting utility losses may be large enough to warrant government intervention. Specifically, when the benefits of helping individuals to make efficient resource allocation objectives (that are also consistent with the preferences of those individuals), exceed the costs, there is an economic (welfarist) case for intervention. This part of the paper is concerned with illustrating several health promotion policies that are motivated by welfarist considerations. In each case, the emphasis is on the source and outcomes of market failure and the mechanisms for its correction.

3.2.1 Market Failure: An Example with Imperfect Information

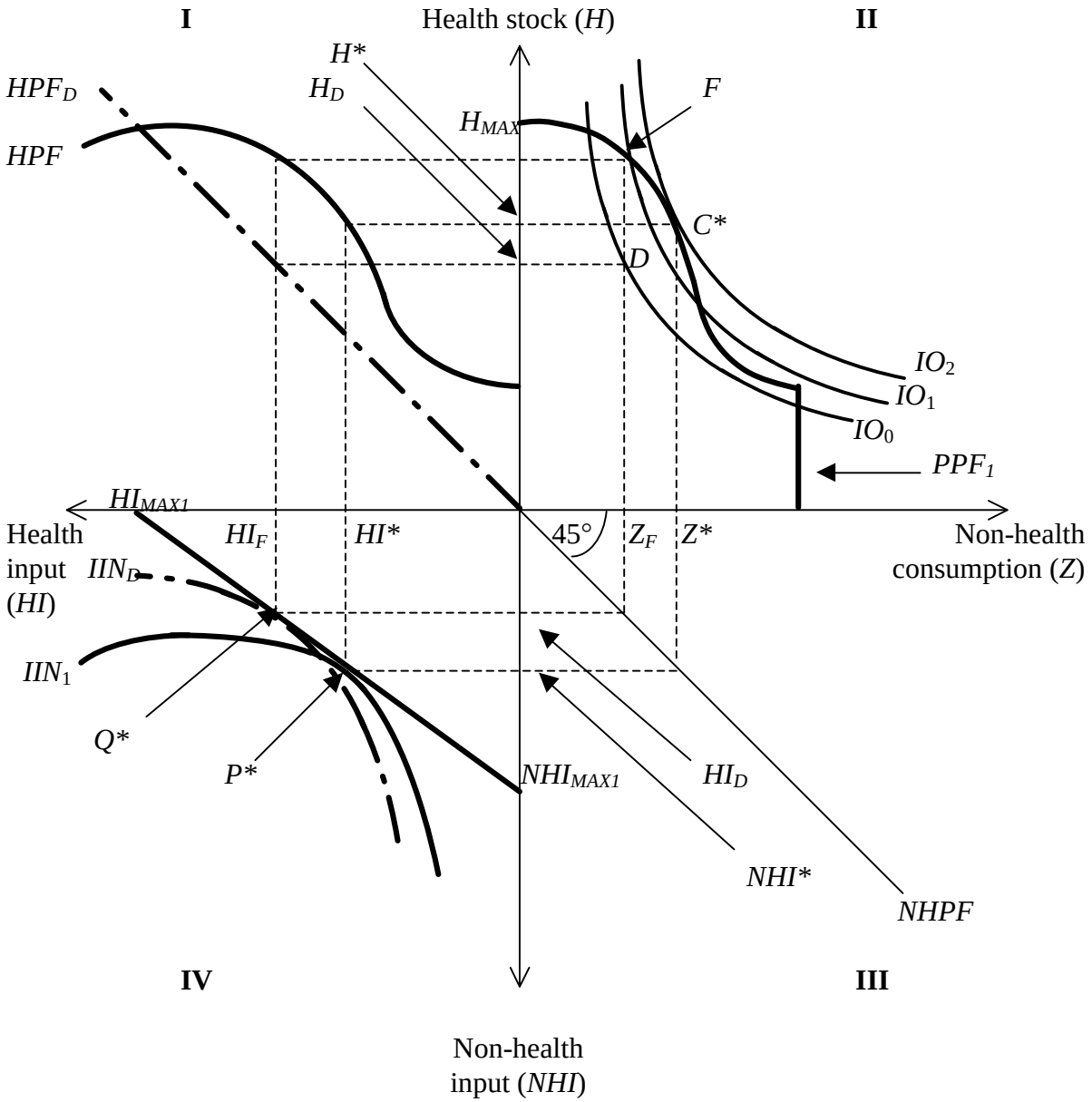
In Figure 5, the output equilibrium was shown to depend on an optimal division of the total budget between health and non-health inputs. Optimal input allocation was shown to depend, in turn, on the individual's (implicitly perfect) knowledge of the technologies for the production of health and other goods. If individuals are not well informed about the technologies of production, however, their resulting input choices may be sub-optimal. Expressed another way, imperfect knowledge can give rise to market failure in the markets under consideration and, just as for other sectors of the economy, an economic argument can be made in such cases for public intervention. In this section, applications of two types of policy instrument, *viz.* information provision, and taxes and subsidies, are explored.

3.2.2 Information Dissemination

Information provision is one of the instruments available to governments when markets fail due to problems of information. Some of the most visible health promotion activities might be justified on such grounds. Elements of the HIV/AIDS media campaigns of the 1980s, arguably fall into the category of information provision. It may be argued that the purpose of those campaigns was to obviate a specific source of market failure, *viz.* imperfect knowledge about a disease and modes of its transmission. Programs that are designed to disseminate accurate information about the relationships between health and diet, exercise, consumption of medical and preventive health care services, and so on, are other examples of this type of health promotion policy.

Figure 6 presents an analysis of the economic role played by welfarist health promotion policies involving the provision of information. Here, it is assumed that the consumer is perfectly informed about the technology of non-health production. It is also assumed, however, that the consumer is ill-informed about the state of health production technology. Suppose that *HPF* again represents the "true" health production relationship, but that the individual mistakenly believes the relationship is that indicated by the dashed line, HPF_D. This individual (who "doesn't know much about health production" (Quadrant I), but "knows what s/he likes" (Quadrant II)) has an input indifference map (e.g., IIN_D in Quadrant IV) that

Figure 6
Knowledge poverty (/misinformation) and disequilibrium in health production



is distorted by his/her misunderstanding of the health production function. How are the consumer's choices and welfare affected by his/her ignorance?

This individual will choose input combination Q^* (Quadrant IV), because s/he expects it to produce the bundle D ($=H_D,Z_D$; in Quadrant II). Although D is inferior to C^*, the consumer's knowledge-poverty misleads him/her to the conclusion that it is the highest-utility bundle that can be produced given the (perceived) technology and the budget constraint. However, the bundle produced as a result of this budget allocation will not be D, but F: the realised production of H will be greater than expected. Although bundle F provides greater utility than D, it is still inferior to the utility-maximising bundle, C^*. Moreover, because health stock is non-tradeable, the consumer cannot augment utility by making *ex post* trades along the *PPF*.

The individual's ignorance of the true relationship between *HI* and *H* is thus a source of welfare loss.

As an aside, it is worthwhile noting that, although *F* is not a utility-maximising basket, its attainment does produce some information about health production that the individual previously did not possess. In subsequent periods, the consumer's learning might be brought to bear on his/her production activities and input allocations so that, by trial and error, the output equilibrium may eventually be achieved. However, the process of discovery of the "true" production relationship could be protracted and/or expensive. The process may be especially costly, in terms of utility forgone, if (i) the individual misinterprets the information produced (e.g., as the result of stochastic shocks); (ii) the health production technology changes over time; and/or (iii) the rate of health stock depreciation changes with age, confounding the signals received. Furthermore, for various conditions of ill-health, the consequences of market failure might be catastrophic if the first opportunity that knowledge-poor individuals have to learn about the relationship between consumption choices and their health consequences arrives too late.

Generally, as the cost of locating the health production function grows, so too does the economic case for public intervention. In the absence of externalities, the welfare benefits of information-disseminating health promotion activities may be conceived in terms of the utility gained by individuals whose search for equilibrium is shortened, as a result of them. The target of health promotion in this (welfarist) case, is the consumer's knowledge state regarding health production; the instrument for its achievement is information dissemination (or "education"); and the welfarist objective is, as always, to augment utility, and hence welfare. (The net benefits of public provision may also be increased by the public good attributes of health information.)

3.2.3 Taxes and Subsidies

An alternative to that outlined above is to levy taxes and/or subsidies on inputs. Specifically, the relative prices of health and non-health inputs can be manipulated in such a way as to bring the information-poor consumer immediately to his/her output equilibrium.

Figure 7 presents an example that is based on the budget constraint and preference sets indicated in Quadrant IV of Figure 6 (other Quadrants are suppressed). The consumer's initial budget constraint, from Figure 6, is $NHI_{MAX1}HI_{MAX1}$, and the full-information indifference curve for inputs is IIN_2. Recall that, if the consumer were well-informed about the technologies of *H* and *Z* production, s/he would have allocated his/her budget to *Q** (=*HI**, *NHI**). However, misinformed input preferences lead to the mistaken choice of *P** (=NHI_D, HI_D). The visible hand of government (Chandler, 1977), manifest as a goods and services or value-added tax and/or subsidy on inputs, can optimally redirect the budget allocation. For example, the prices implied by the budget line $NHI_{MAX2}HI_{MAX2}$ will effect the consumption of Q^* by the consumer. Thus, the effective policy involves a tax on health inputs, and a subsidy non-health inputs. Notably, although the policy is utility-improving in output space (since it is consistent with the output bundle *C** in Quadrant II, in Figure 6), the input tangency *Q** implicates a lower poor-information input indifference curve (IIN_{D2}), than the pre-intervention basket, P^*.

Figure 7
Taxes and subsidies to achieve output equilibrium in the presence of misinformation about health production

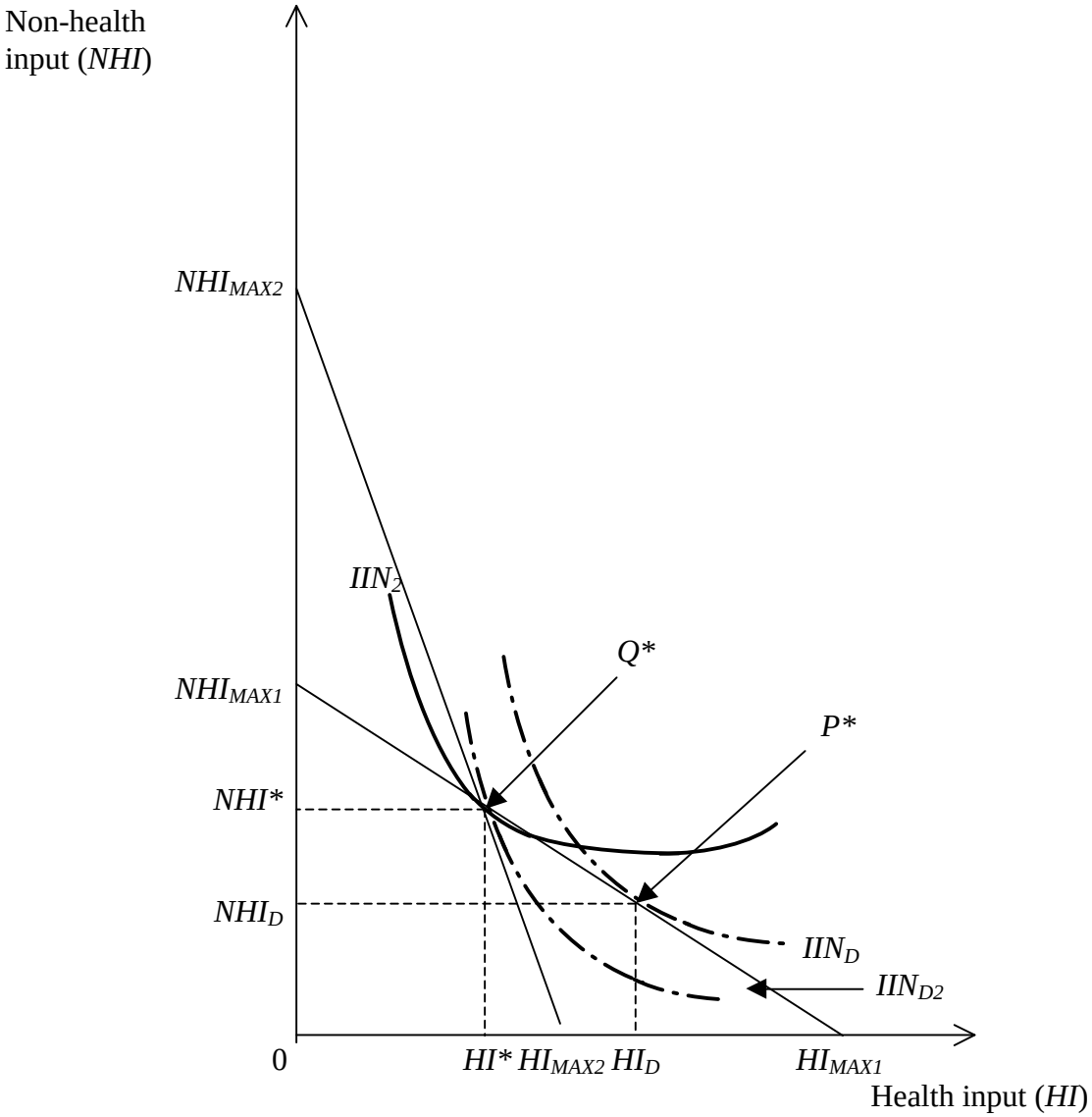


Figure 7 shows how applications of taxes and/or subsidies can be used as instruments of "health promotion" when market failure by information occurs. However, for pragmatic reasons, these are not likely to be efficient instruments to employ when information is the source of market failure. The practical difficulties are first, that the requirement for information about consumer preferences is formidable: to formulate efficient policy, the health promoter must be as good a judge of individual welfare as the individual concerned! Second, since health policy is constituted over groups of individuals, with inevitably heterogeneous preferences, generalising such a policy involves tailoring tax and subsidy provisions, perhaps even at the level of individuals.

It is noteworthy that the previous two Figures illustrate cases in which efficiency is promoted by applying instruments that actually lead to a **reduction** in the consumption of health inputs. This analytical outcome is deliberate. It is designed to illustrate the fact that, in some (perhaps

"special") cases, health policies that are motivated by welfarist concerns do not invariably result in increased health input consumption.

The tax and subsidy instruments discussed above can also be used to pursue other, non-welfarist, health promotion ends. The focus of the paper is now directed to a discussion of such ends and some policy applications.

3.3 Non-Welfarist Health Promotion Strategies

Consider Figure 8, in which the (non-welfarist) health promoter's indifference curve, IO_{HP}, in Quadrant II, is added to the framework used for Figures 6 and 7. The form of this dashed indifference curve (kinked at the point *F*) suggests a special case that has not previously been considered, *viz.* that in which a_{HP} is not a constant, but depends in part on the quantity of *H* the individual has. Specifically, for $H > H_F$, $a_{HP} < 1$; while, for $H < H_F$, $a_{HP} = 1$ (and hence indifference curves lower than IO_{HP} (not depicted) are lines parallel to the *x*-axis). This formulation assumes health target-setting behaviour, rather than health maximisation, on the part of the health promoter. The remaining analyses suppose that the health promoter's utility function is of this nature, although the conclusions are insensitive to this idiosyncratic (or, some may say, "Marie Antionettesque") preference formulation.

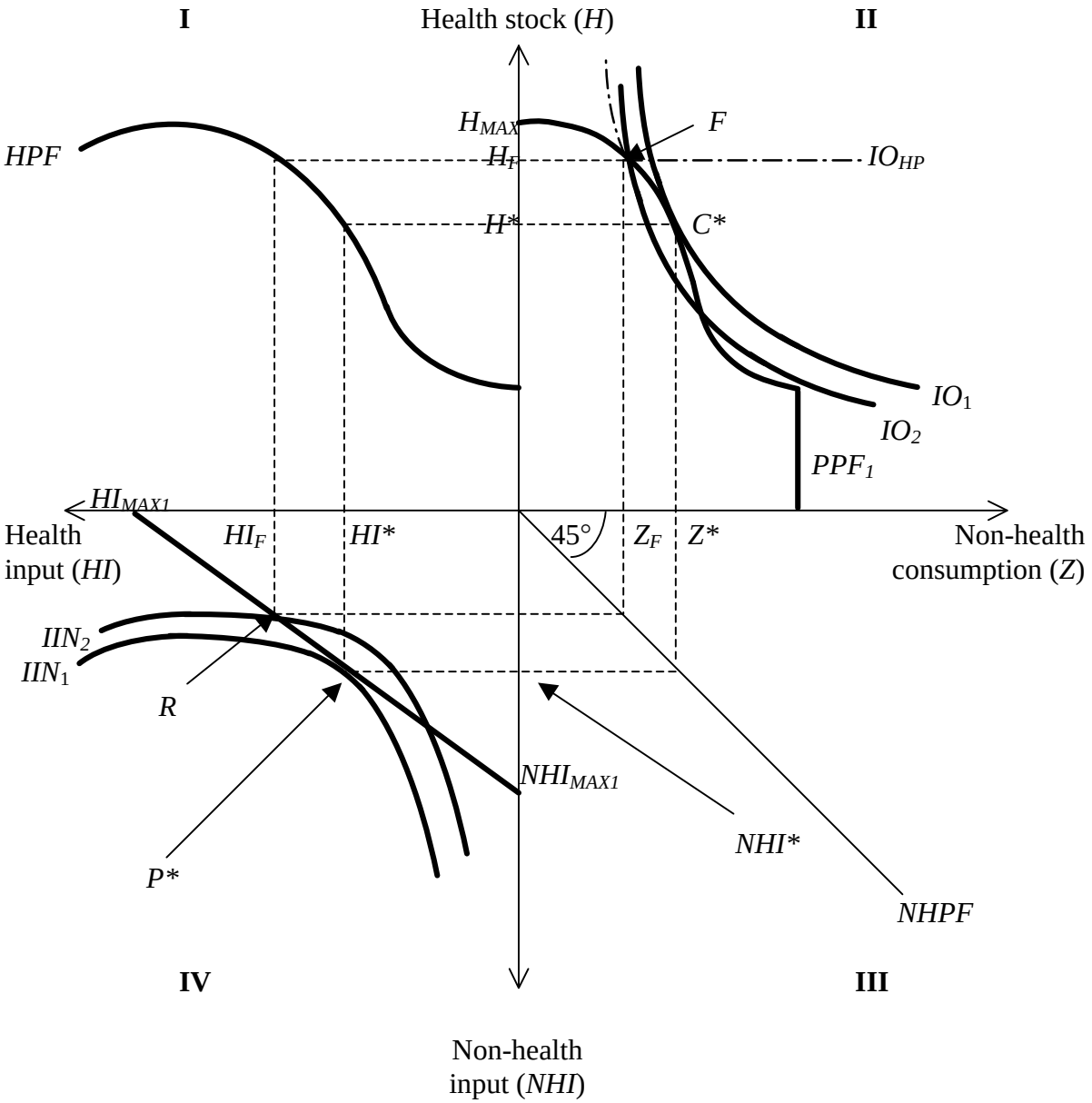
From the point of view of the health promoter, the utility-maximising output bundle in Figure 8 is *F*, in Quadrant II. Its production demands that the *j*th individual select the input combination ($R=H_F,HI_F$). The critical observation to be drawn from Figure 8 is that the individual's equilibrium, *C*, represents disequilibrium to the non-welfarist health promoter (and *vice versa*). Attention is now directed to some mechanisms by which the health promoter might affect increases in his/her utility, by changing the composition of the *j*th individual's output bundle.

3.3.1 Disinformation, Misinformation, Reinforcement, and Exaggeration as Policy Instruments

The health promoter could attempt to affect the individual's basic preferences over *H* and *Z*, so that individual's preferences, and equilibrium, are identical (or closer) to those of the health promoter. In order to do so, the intrinsic values the individual places on health and other consumption must be affected. How might this be done? Perhaps an advertising strategy that extols the virtues of a particular lifestyle may be undertaken in an attempt to change the preferences of individuals for "health", itself (i.e. to affect the individual's $MRTS_{ZH}$). Geometrically, such strategies can be depicted as attempts to change the slopes of the individual's output indifference curves (e.g., in Quadrant II of Figure 8) so that *F* represents a tangency between the existing *PPF* and the individual's "reformed" indifference curves. (The geometric exposition is not provided here, for reasons of space.)

Another strategy involves manipulating the preferences of individuals over health and non-health inputs to achieve the health promoter's utility-maximising bundle. The instruments that might be used to effect this change, in input space, are (i) non-information strategies; and (ii) disinformation strategies, which are designed to persuade individuals to allocate more of the budget to health inputs than is actually utility-maximising. Category (i) includes advertising campaigns that are designed to modify the consumption of commodities via persuasion/reinforcement, rather than the provision of novel information. The mandated

Figure 8
"Non-welfarist" health promotion: an advertising strategy that impacts on attitudes to health and other consumption



warnings on cigarette packets (e.g., "Smoking Kills", "Smoking Causes Heart Disease", "Smoking Causes Lung Cancer", and so on) are, perhaps, examples.

Category (ii) includes programs that are designed to exaggerate the perceived risks, costs, or benefits, of particular consumption decisions. The exaggerated claims sometimes made by private, profit-maximising, firms perhaps spring readily to mind in this regard. However, public health authorities may also pursue strategies of this nature or, at least, strategies that result in exaggerated perceptions of health risks. Some further elaboration on this point is provided, below.

Although these non-welfarist strategies involve the dissemination of data, they are motivated by the pursuit of a health objective, not the welfare-maximising objective. Strategies (i) and (ii) are designed to affect individuals' preferences over **inputs**. Geometrically, this implies changing the slopes of the indifference curves in Quadrant IV (i.e., consumers' marginal rates of substitution of health for non-health inputs). Recall that the input indifference curves in Quadrant IV are derived from the information about output preferences and production technologies contained in Quadrants I-III. Thus, the mechanism for strategies (i) and (ii) is the modification of consumer knowledge (by misinformation) about health production technology. The case can be understood by returning to Figure 6, and recalling that HPF_D represented the individual's distorted view of the "true" health production relationship *HPF*. It was supposed above that such distortions could be created by the deliberate provision of misinformation and/or by exaggeration. In such cases, one might view HPF_D, not as the product of ignorance, but the product of misinformation that forms part of a non-welfarist health promotion policy to improve health. Its effects are to distort input preferences (IIN_D), giving rise to the consumption of *Q**, and the production of *F*. This bundle maximises the health promoter's utility, but is strictly inferior to *C**, from the individual's point of view.

3.3.2 Taxes and Subsidies

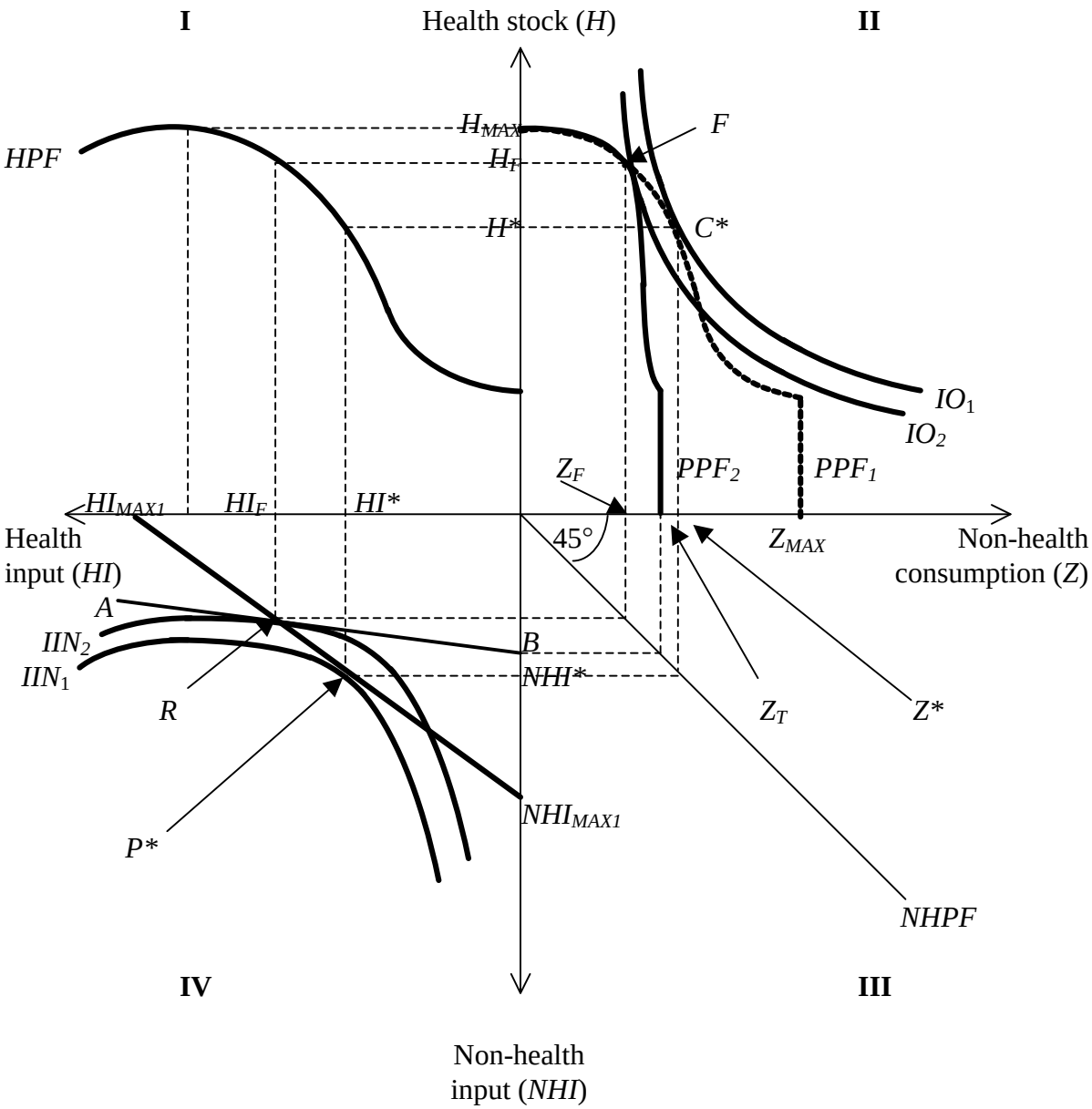
Taxes and subsidies may also be used as non-welfarist instruments of health promotion. Figure 9 provides an example of the impact of taxes and subsidies on individual choices and outcomes. The initial inputs budget line is $NHI_{MAX1}HI_{MAX1}$. The production-consumption possibilities for the individual are given by the dotted-curve marked *PPF* in Quadrant II. The individual's initial input and output equilibria are *P** and *C**, respectively.

In order to give rise to the input equilibrium, *R*, which produces the output bundle *F*, the relative prices of health and non-health inputs must be changed. The relative price ratio that will lead this individual to choose *F* is the ratio given by the budget line *AB* (in Quadrant IV). An important impact of the tax and subsidy arrangements implied by *AB* is that they change the production-consumption possibilities (or "opportunity set") for the individual. For example, even if the entire budget is spent on non-health production-consumption, the resulting basket contains only Z_T, compared with the pre-tax-subsidy possibility of Z_{MAX} . The individual's post-tax-and-subsidy production possibilities are given by PPF_2 which coincides with *PPF* only for baskets where $H>H_F$. Notably, all bundles that contain $H<H_F$ contain less *Z* than was produced prior to the introduction of the tax on non-health inputs. The *y*-axis intercept of PPF_2, H_{MAX1}, is identical to that of *PPF*: the marginal product of health input quantities $HI>HI_E$ is zero, or negative (and HI_E was available to the individual before the introduction of the tax and subsidy arrangements ($HI_{MAX1} > HI_E$)). The individual's post-tax-and-subsidy output equilibrium is thus *F*, which maximises the utility of the health promoter. Notably, *F* is an inferior basket to *C**, in the view of the individual consumer-producer, because *F* occurs on a lower indifference curve (IO_2) to *C** (on IO_1).

3.3.3 Quantity Controls

Finally, it is worthwhile to consider non-price limitations on opportunity sets. Such limitations are, in fact, commonplace and include measures such as place-specific bans on smoking and the consumption of alcohol, as well as embargoes on the consumption (and production) of drugs such as cocaine, heroin, and so on. Although negative externalities (such as the effects of passive smoking, for example) may provide some welfarist justifications for

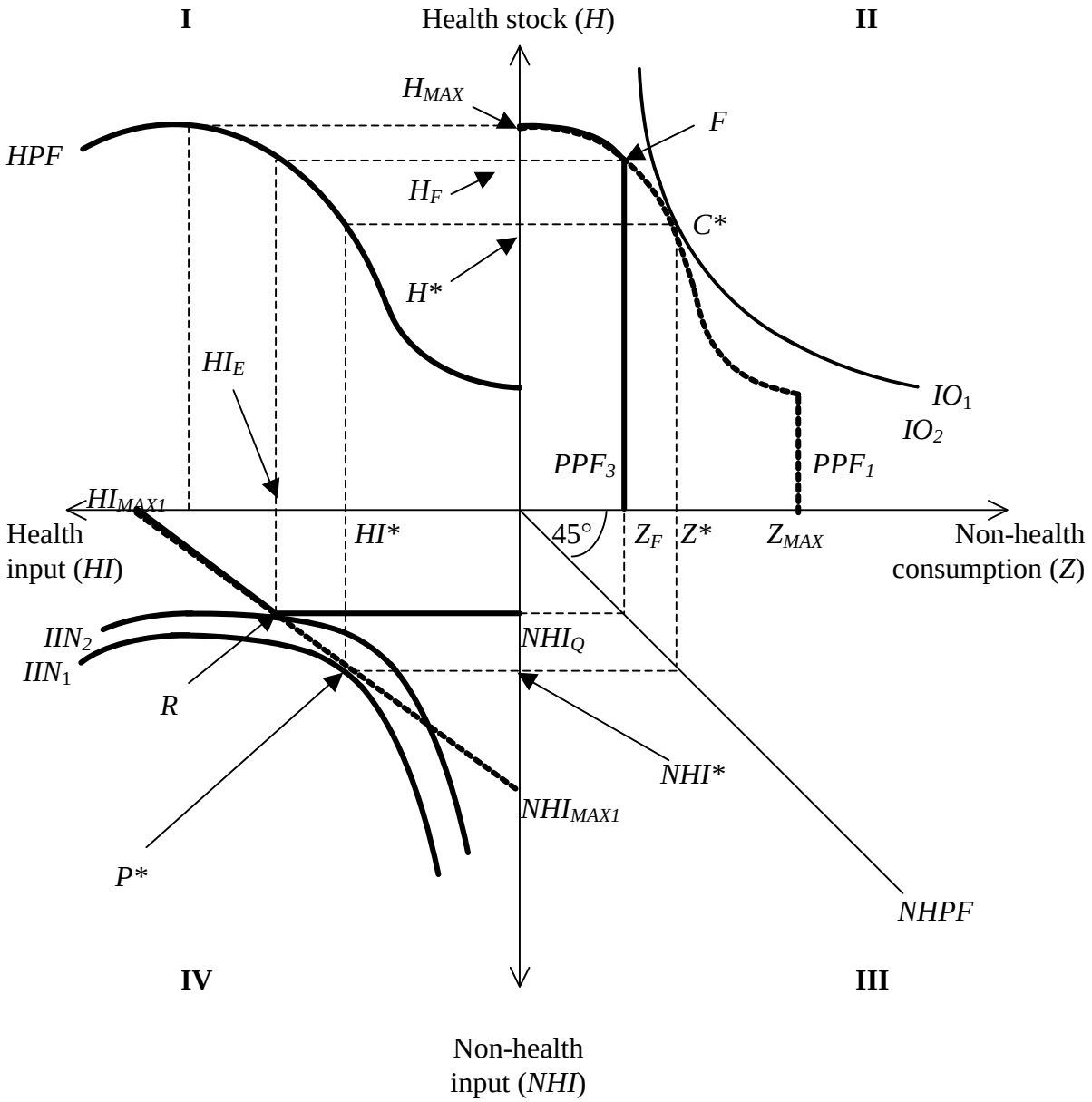
Figure 9
Taxes and subsidies as instruments of "non-welfarist" health promoters



the institution of quantity limits, i.e. quantity limits that are potential-Pareto-improving, the institution of quantity controls can also be motivated by other (non-welfarist) objectives.

Consider Figure 10, which contains many of the elements of Figure 9 and in which the individual's equilibrium is given, initially, by *C** (Quadrant II) and *P** (Quadrant IV). Suppose that the health promoter's (utility-maximising) goal is, once again, for the individual consume bundle *F*. A consumption quota on non-health inputs could be introduced to modify the individual's opportunity set and effect the production of output bundle *F*. Specifically, a non-health inputs quota of NHI_Q will render the individual's inputs budget constraint HI_{MAX1} NHI_Q. The effect of the quota is to kink the budget line at *R*, which is then tangent to IIN_2.

Figure 10
A non-health inputs consumption quota as an instrument of health promotion



The quota renders the budget line perpendicular to the *y*-axis for all $HI<HI_F$ and the new production-consumption possibilities are given by the transformation function PPF_2.

A notable characteristic of PPF_2 is that it is parallel to the *y*-axis for all $H<H_F$, indicating the impossibility of transformations of *H* for *Z* in this region, due to the imposition the quota. Thus, *F* becomes the utility-maximising combination for the individual, but leaves the consumer with less utility than at *C**.

The converse of the policy just discussed involves the public provision, perhaps at the zero price, of a good or service that is health-improving. As with the policies discussed previously, this instrument could be applied to achieve a target that is motivated by either welfarist considerations (e.g., to correct the sub-optimal provision of a public good), or non-welfarist

considerations. Such policies, although not depicted geometrically here, pivot the inputs budget constraint at the *NHI* intercept, increasing HI_{MAX1}. In output space, the effect is to pivot the *PPF* at its *Z* intercept, increasing the *H* intercept, provided the marginal product of health inputs is positive.

3.4 A Further Note on Non-Welfarist Health Promotion Strategies

Every tobacco death is preventable. That is [the Tobacco Free Initiative's] message and challenge (World Health Organization, 2001, http://tobacco.who.int).

A detailed empirical analysis of the stated objectives, instruments, targets, and consequences (e.g., in terms of welfare, health-stock, etc.) of a range of health promotion programs is beyond the scope of this paper. However, lest the non-welfarist notions expressed above be thought chimerical, it is useful to set them in an empirical context. In the interests of brevity, attention will be focussed exclusively on the World Health Organization's "*Tobacco Free Initiative* (TFI)" (World Health Organization, 2001). In particular, the apparent objectives, targets and instruments associated with this Initiative will be explored, alongside some pertinent academic literature on tobacco consumption. The treatment is not exhaustive, but is designed to illustrate some apparent examples of the non-welfarist issues discussed above.[1]

The TFI is an international program that was launched by the World Health Organization "cabinet" late 2000. The French-language title of the World Health Organization's TFI, i.e. *Initiative Pour un Monde Sans Tabac*, is perhaps more lucid than its English-language counterpart. Taken together with the proclamation of the TFI's purpose (cited above), there is little room for interpretation: the target/objective of the TFI is to reduce the number of tobacco deaths to zero. The ideal via which this target is to be achieved is the creation of a worldwide environment that is tobacco free.

Although it may be possible to construct a welfarist case in support of the TFI's objectives/targets, such a case has (i) not been presented in the TFI documentation (see World Health Organization, 2001, http://tobacco.who.int, linked pages and documents); and (ii) appears difficult to extract from their contents. The competing thesis is that the TFI is motivated by non-welfarist considerations. To this end, it may be proposed that the target and objective of the TFI are one and the same: to eradicate tobacco deaths. Additionally, the (idealistic) means stated for achieving this target, *viz.* the eradication of tobacco *per se*, appears consistent with some of the general non-welfarist strategies that were described above (e.g., quantity controls, taxes, subsidies).

At a more pragmatic level, the World Health Organization (2001) provides some advice on instruments of TFI policy, including "media advocacy" programs. Advocacy, according to the World Health Organization (2001, http://tobacco.who.int/en/ advocacy/definitions.html)

... is the pursuit of influencing (*sic.*) outcomes - including public policy and resource allocation decisions within political, economic, and social systems and institutions that directly affect people's lives;
and it

...requires both affirmative policy advocacy and aggressive counteraction to opposition strategies and tactics. In fact, a media advocacy campaign resembles a political campaign, in which the competing

forces continuously react to the evolving media environment, leading stories, unexpected events, and breaking news (World Health Organization, 2001, http://tobacco.who.int/en/advocacy/index.html).

The following passage provides further illumination about the nature of the 'information' to be disseminated:

That tobacco use causes disease and death must be heralded by the media, as often as possible, and in as dramatic a story as possible. But it is not merely the volume of news that determines an issue's ascension onto the policy agenda...the frame is the central organizing principle that structures meaning...**it signals to people how to think about an issue**, not merely what issue to think about (World Health Organization, 2001, http://tobacco.who.int/en/advocacy/principle.html, emphasis added).

The moderating effects of consumer preferences and knowledge on the impact of this message (on tobacco consumption) are also addressed. In a list of the "five most common mistakes associated with public interest campaigns" two of the "mistakes" listed, and their narratives, are as follows:

...[Mistake number] 2. *The public opinion is the message.*

Remember that the public's understanding of an issue is often what you are up against, not where you want to end up; while you need to connect to public opinion, you do not need to repeat faulty models and further reinforce them.

... [Mistake number] ***4. All people need are the facts, or more facts.***

Remember that, **until you change the frame, the facts will not add up to a change in attitude or policy preference** (World Health Organization, 2001, http://tobacco.who.int/en/advocacy/principle.html, emphasis added).

Arguably, it is difficult a welfarist theme is difficult to extract from these statements. Such a theme becomes even more difficult to construct when one considers the statements above alongside empirical evidence on consumers' perceptions of health risks. In particular, findings about risk perceptions derived from the field of cognitive psychology and recent empirical results in related literatures are pertinent.

Viscusi's extensive research on risk perceptions and tobacco consumption is particularly noteworthy in the present context. *Inter alia*, Viscusi (1990) has found that most US smokers and non-smokers overestimate the risk of lung cancer due to smoking, and few underestimate it. Additionally, in his sample of over 3,000 individuals, he found the extent of overstimation to be 20 times as great as the amount of understimation of risk and, furthemore, that smokers' overestimates of risk are generally greater than (and statistically significantly different to) those of non-smokers (Viscusi, 1990). He has also found that risk overestimates are generally more pronounced in younger age groups (Viscusi, 1991). Finally, his results also show that US tobacco taxes are large enough to induce reductions in tobacco consumption that far exceed those which are predicted using objective/actual health risk probabilities and published price elasticity data (Viscusi, 1990). (Viscusi (1999) has also found that, even at the level of the US state, tobacco consumption is always "self-financing" – a result that may cast doubt on the externality-based public health arguments for further tobacco tax increases in that country.)

Under the circumstances described above, correcting consumer perceptions of risk by providing information about the relationship between tobacco consumption and health outcomes might actually be expected to **increase** tobacco consumption. Information provision (or the provision of "more facts") might, therefore, be quite incompatible with the TFI target/objective, under these circumstances. Consider, on the other hand, the recommended TFI strategy of emphasising the message that "...tobacco use causes disease and death ...as often as possible, and in as dramatic a story as possible." The cognitive psychology literature provides reason to believe that such strategies might actually encourage overestimates of risk. Specifically, the so-called "availability heuristic"

> ...predicts that people judge an event as more likely or more probable if it is easily brought to mind. For example, Slovic *et al.* found that survey respondents overestimated the frequency of rare causes of death (murder, care accidents) and underestimated the frequency of more common causes (such as stroke and stomach cancer). **Overestimates may have occurred because [the former] were more dramatic or sensational** (Lloyd, 2001, i14, emphasis added).

Indeed, that such upward-bias in perceptions of risk arises for highly-publicised phenomena is well-accepted (Fischhoff, Lichtnestein, Slovic, Derby and Keeney, 1981; Viscusi, 1998). Recent work by Viscusi (1997) suggests that the availability heuristic is at work in relation to environmental risks too; and, in another field subject to health promotion initiatives, Paul, Barratt, Redman, Cockburn & Lowe (1999), found that a large proportion (64.7 per cent) of a sample of 1000 Australian women overestimated their lifetime risk of breast cancer. In the context of such empirical results on risk, strategies that are designed to dramatise and raise the frequency of messages that pertain to smoking risk appear more compatible, in effect, with strategies that are designed to exaggerate risk perceptions

The preceding discussion is, of course, far from conclusive about (i) the motivation for the TFI; and (ii) the compatibility, or otherwise, of the program with welfarist objectives. Indeed, it is possible to construct welfarist arguments, such as arguments of inter-temporal myopia (Pigou, 1932), to support components of the Initiative. The World Health Organization itself, however, has not sought to construct any coherent argument of the latter kind to support its Initiative. Thus, while inconclusive, this brief discussion illustrates some aspects of a *bona fide* health promotion program that cannot be ruled inconsistent with the non-welfarist notions introduced above.

4. CONCLUSION

The economic conception of health promotion produced in this paper permits an analysis of the instruments and targets of an important sub-sector of the health economy. The analysis is not exhaustive, but it does illustrate the fundamental importance of policy objectives in relation both to the selection of health policy targets and instruments and their welfare effects. The general result, although familiar to welfare economists and students of the public economics literature, deserves emphasis in the context of health promotion programs: the welfare effects of public policy can be materially affected by the objective pursued by the policy maker. When the objective of interest is a health target, for example, only by chance is the result likely to constitute a welfare maximum.

The conceptual results emphasise that, when policies are constituted on non-welfarist grounds, whether those grounds be benevolent or otherwise, it is well to recognise the related,

and material, risk of generating welfare losses thereby. Programs that foster exaggerated views of health risks (for example), may themselves be sources of welfare loss. For these reasons, it is important for policy makers to be clear about the objectives, targets and instruments of health promotion programs. The objectives, targets and instruments of health promotion appear to provide fertile ground for empirical research. Furthermore, the relationship between health promotion programs and consumer perceptions of risk, as well as the impacts of these phenomena on market efficiency and market failure demand the attention of researchers and policy-makers alike.

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FOOTNOTES

1. The author is a non-smoker.

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APPENDIX 1

In Grossman's (1972) model, utility-maximising individuals face intertemporal utility functions that contain the stock of health and other goods and services as arguments:

$$U = U(f_0 H_0, ..., f_n H_n, Z_n, ...Z_n) \quad (1)$$

where H_t is the stock of health in the period t, f_t is the number healthy days derived per unit of health stock in the ith period (Grossman's "service flow"), and Z_n is total consumption of another commodity consumed in period i. The length of the individual's life is n, and is not endogeneous, i.e. it depends, *inter alia*, on the utility-maximising choices of the individual between the Z_i and H_i.

Gross investment in health in any period is given by

$$H_{i+1} - H_i = I_i - d_i H_i \quad (2)$$

where I_i is gross investment and d_i is the rate of depreciation in the ith period. Both the H_i and the Z_i vectors are household-produced by combining market inputs (goods and services) and the individual's own-time, according to the following production functions:

$$\begin{aligned} I_i &= I_i(HI_i, TH_i; E_i) \\ Z_i &= Z_i(X_i, T_i; E_i) \end{aligned} \quad (3)$$

where HI_i is the goods and services input for health production (or gross investment), where health inputs are defined as those goods and services demanded primarily for their perceived impact on health status.[1] X_i is the goods and services input employed in the production of Z_i, TH_i and T_i are the time inputs involved in the production of health and Z_i, respectively, and E_i is the stock of human capital.

For convenience, assume that production functions (3) are homogeneous of degree one. The gross investment production function can thus be rewritten as

$$I_i = HI_i g(t_i; E_i) \quad (4)$$

where t_i $(= \frac{TH_i}{HI_i})$ is the time input required to produce one more gross investment unit. The marginal products of TH_i and HI_i are thus

$$\begin{aligned} \frac{\partial I_i}{\partial TH_i} &= \frac{\partial g}{\partial t_i} = g' \\ \frac{\partial I_i}{\partial HI_i} &= g - t_i g' \end{aligned} \quad (5)$$

The individual's "full wealth" constraint, R, is the present value of potential earnings (if all time is spent working), plus the value of initial assets, A_0.[2]

$$R = \sum \frac{P_i HI_i + V_i X_i + W_i(TL_i + TH_i - T_i)}{(1+r)^i} = \sum \frac{W_i \Omega}{(1+r)^i} + A_0 \quad (6)$$

where P_i is the unit price of health input, V_i is the unit price of X_i, W_i is the wage rate, TL_i is time lost to illness. Equation (6) states that the consumer's total wealth is exhausted by expenditure on market goods, non-market production activities, and sick time.

The equilibrium quantities of H_i and Z_i are given by maximising (1) subject to (2), (3) and (6). However, since H_0 and d_i are given, the optimal quantity of health capital in the ith

[1] This conception of the delineation of 'health' inputs from 'non-health' inputs is similar to Evans's (1984) method of delineating 'health economics' from other sub-sectors of the discipline of economics.

[2] Becker's (1965) model involved the specification of a 'full income' model, since Becker's theory of the allocation of time was not specified as an intertemporal model.

period is determined directly by the optimal quantity of gross investment in the preceding period, and hence the first-order optimality conditions derived by Grossman (1972) are

$$\frac{p_{i-1}}{(1+r)^{i-1}} = \frac{W_i G_i}{(1+r)^{i}} + \frac{(1-d_i)W_{i+1}G_{i+1}}{(1+r)^{i+1}} + \ldots + \frac{(1-d_i)\ldots(1-d_{n-1})W_n G_n}{(1+r)^{n}} + \frac{Uh_i}{l} G_i + \ldots + (1-d_i)\ldots(1-d_{n-1})\frac{Uh_n}{l} G_n \quad (5)$$

and

$$p_{i-1} = \frac{P_{i-1}}{g - t_{i-1}g'} = \frac{W_{i-1}}{g'} \quad (6)$$

where p_i is the marginal cost of gross investment in health, G_i is the marginal product of the health capital stock, Uh_i is the marginal utility "healthy days" (U is utility, h_i is the number of healthy days in period i), and l_i is the marginal utility of wealth in period i.

Equation (5) determines the optimal quantity of gross investment in period i. It states that, in equilibrium, the utility-maximising individual will make gross investments in health capital until the discounted marginal cost of a marginal increment in gross investment just equals the discounted incremental benefit. Notably, the benefits measured on the right-hand-side of equation (5) include (i) the discounted money value of the increase in total time available to the individual; and (ii) the discounted money equivalent of the increase in utility arising from an increased number of healthy days.

Equation (6) provides the condition for efficient time and market good input choice for the production of health: in equilibrium, the ratio of the price of market health inputs to their marginal product will be equal to the ratio of the wage rate to the marginal product of time.